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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,789	10/27/2003	Thomas L. Toth	GEMS8081.193	2788

27061 7590 07/14/2005

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EXAMINER	
KAO, CHIH CHENG G	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/605,789	TOTH ET AL.	
	Examiner	Art Unit	
	Chih-Cheng Glen Kao	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5,6,8-14 and 16-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5,6,8-14 and 16-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2, and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romeas (US Patent 6148062) in view of Moore (US Patent 4181858).

2. Regarding claim 1, Romeas discloses an x-ray beam shaping filter assembly (fig. 5) comprising a first moveable filter having a non-uniform thickness (fig. 5, #17a), the first moveable filter having a body (fig. 5, middle section of #17a) and a tail (fig. 5, right section of #17a) extending from the body, the tail positioned at a distal end of the first moveable filter relative to an x-ray source designed to project x-rays from a focal point (fig. 5, source of #3), a second moveable filter independent of the first moveable filter and having a non-uniform thickness (fig. 5, #18b), the second moveable filter having a body (fig. 5, middle section of #18b) and a tail (fig. 5, left section of #18b) extending from the body, the tail positioned at a distal end of the second moveable filter relative to an x-ray source (fig. 5, source of #3); and wherein at least one of the first moveable filter and the second moveable filter is configured to be placed in a high frequency electromagnetic energy beam (fig. 5, #3) for attenuation of the beam for

radiographic data acquisition (title), and configured to independently position a movable filter (fig. 5, #18b) such that a beam profile is created that substantially conforms to a shape of a subject to be scanned (fig. 5, #1).

However, Romeas does not disclose at least one motor assembly, first and second moveable filters each defined by a base, a tail, and a curved portion connecting the base to the tail, and wherein a first moveable filter is positioned nearer to an x-ray source focal point than a second moveable filter.

Moore teaches at least one motor assembly (fig. 2a, #30), first and second moveable filters are each defined by a base (fig. 3a, right section of #26 on right), a tail (fig. 3a, left section of #26 on right), and a curved portion (fig. 3a, middle section of #26 on right) connecting the base to the tail, and wherein a first moveable filter (fig. 1a, #26 next to 16) is positioned nearer to an x-ray source focal point (fig. 1a, focal point from #16) than a second moveable filter (fig. 1a, #26 next to 2).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Romeas with the motor of Moore, since one would be motivated to make such a modification to reduce manual labor for a user.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Romeas as modified above with the filters of Moore, since one would be motivated to make such a modification to better compensate for variations in path length of examining radiation through the body of a patient (col. 1, lines 5-9) as shown by Moore.

3. Regarding claim 2, Romeas further discloses the second moveable filter (fig. 5, #18b) having a shape that mirrors that of the first moveable filter (fig. 5, #17a).

4. Regarding claim 8, Romeas as modified above suggests an apparatus as recited above.

However, Romeas does not disclose wherein the base has a thickness greater than that of the tail.

Moore further teaches wherein the base (fig. 3a, right section of #26 on right) has a thickness greater than that of the tail (fig. 3a, left section of #26 on right).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Romeas as modified above with the filters of Moore, since one would be motivated to make such a modification to better compensate for variations in path length of examining radiation through the body of a patient (col. 1, lines 5-9) as shown by Moore.

5. Regarding claims 9 and 10, Romeas as modified above suggests an apparatus as recited above.

However, Romeas does not disclose wherein the base has a thickness of 30 mm and the tail has a thickness of 0.25 mm, or wherein the base of the first moveable filter has a length along an x-direction of 112 mm; wherein the curved portion of the first moveable filter has a length along the x-direction of 24.9 mm; wherein the tail of the first moveable filter has a length along the x-direction of 135 mm; wherein the base of the second moveable filter has a length along the x-direction of 53 mm; wherein the tail of the second moveable filter has a length along the x-

direction of 168 mm; and wherein the curved portion of the second moveable filter has a length along the x-direction of 34.2 mm.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Romeas as modified above with the above measurements, since such a modification would have only involved a mere change in the size of a component. A change in size is generally recognized as being with the level of ordinary skill in the art. One would be motivated to make such a modification to reduce unnecessary radiation to a patient (col. 5, line 66, to col. 6, line 3) as implied from Moore.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Romeas and Moore as applied to claim 1 above, and further in view of Popescu (US Patent 6501828).

Romeas as modified above suggests an apparatus as recited above.

However, Romeas does not disclose dynamically positioning a moveable filter during data acquisition.

Popescu teaches dynamically positioning a moveable filter (fig. 2) during data acquisition (abstract).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Romeas as modified above with the dynamic moveable filter of Popescu, since one would be motivated to make such a modification to simplify the generation of high grade x-ray images (col. 2, lines 1-7) as shown by Popescu.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Romeas, Moore, and Popescu as applied to claim 5 above, and further in view of Hsieh (US Patent 5970112).

Romeas as modified above suggests an apparatus as recited above.

However, Romeas does not disclose positioning based on a scout scan carried out before CT data acquisition.

Hsieh teaches positioning based on a scout scan carried out before CT data acquisition (abstract).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Romeas as modified above with the positioning of Hsieh, since one would be motivated to make such a modification to make CT systems more efficient (col. 2, lines 15-16) as implied from Hsieh.

8. Claims 11, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Popescu and Hoffman et al. (US Patent 6137857).

9. Regarding claims 11 and 14, Moore discloses an apparatus as recited above. Moore further discloses the apparatus in a CT system (abstract, line 1) including a rotatable gantry having an opening (fig. 1a, #1) to receive a subject (fig. 1a, #3) to be scanned, a high frequency electromagnetic energy projection source (fig. 1a, #14), a scintillation system to detect high frequency electromagnetic energy passing through the subject (col. 4, line 68), photodiodes optically coupled to the scintillation system to detect light from the scintillation system (col. 5,

line 1), a data acquisition system (DAS) connected to the photodiodes and configured to receive photodiode outputs (fig. 1a, #19).

However, Moore does not specifically disclose non-uniform filters mirroring each other defined by a base, tail, and curved portion connecting the base to the tail, and wherein filters are arranged such that the curved portion of one filter generally faces the high frequency electromagnetic energy projection source and the curved portion of the other filter generally faces the high frequency electromagnetic energy projection source, a scintillator array, a photodiode array, and an image reconstructor coupled to a DAS and configured to reconstruct an image of a subject from photodiode outputs received by the DAS.

Popescu teaches non-uniform filters mirroring each other (fig. 3) defined by a base (fig. 3, exterior portion of filters), tail (fig. 3, interior portion of filters), and curved portion (fig. 3, middle portion of filters) connecting the base to the tail, and wherein filters are arranged such that the curved portion of one filter generally faces (fig. 3, #22) the high frequency electromagnetic energy projection source (fig. 3, source from "F") and the curved portion of the other filter generally faces (fig. 3, #23) the high frequency electromagnetic energy projection source (fig. 3, source from "F"). Hoffman et al. teaches a scintillator array (col. 2, line 3), a photodiode array (col. 2, lines 2-3), and an image reconstructor (fig. 2, #34) coupled to a DAS (fig. 2, #34) and configured to reconstruct an image of a subject (fig. 2, #22) from photodiode outputs (fig. 2, #20) received by the DAS.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the system of Moore with the filters of Popescu, since one

would be motivated to make such a modification to simplify generation of a high-grade x-ray image of a region of interest (col. 2, lines 1-4) as implied from Popescu.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the system of Moore with the arrays and image reconstructor of Hoffman et al., since one would be motivated to make such a modification to increase the amount of information obtained (col. 1, lines 35-36) and to provide a better image (fig. 2, #42) of the internals of a patient (fig. 2, #22) as implied from Hoffman et al.

10. Regarding claim 16, Moore further discloses wherein the base blocks more x-rays than that of the tail (fig. 2a, #26 and 26').

11. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore, Popescu, and Hoffman et al. as applied to claim 11 above, and further in view of Hsieh.

Moore as modified above suggests a system as recited above. Moore further discloses a filter (fig. 5, #26) operationally connected to at least one motor (fig. 5, #30) that is operationally connected to a controller (fig. 5, #36) such that control signals transmitted to the controller cause at least the one motor to position the at least one filter in the projection path to modulate the beam to have a desired profile (fig. 2a).

However, Moore does not disclose a computer programmed to cause application of a scout scan of a subject and from the scout scan determine at least an approximate shape of the subject, and wherein a filter is operationally connected to the computer to modulate the beam to have a desired profile.

Hsieh teaches a computer (fig. 2, #36) programmed to cause application of a scout scan of a subject and from the scout scan determine at least an approximate shape of the subject, and wherein a filter is operationally connected to the computer to modulate the beam to have a desired profile (abstract).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the system of Moore as modified above with the scout scan and computer of Hsieh, since one would be motivated to make such a modification to make CT systems more efficient (col. 2, lines 15-16) as implied from Hsieh.

12. Claims 17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Popescu in view of Toth et al. (US patent 6307918) and Moore.

13. Regarding claim 17, Popescu discloses an apparatus comprising a moveable first filter having a curved portion (fig. 3, #22) and a moveable second filter having a curved portion (fig. 3, #23), the moveable first filter (fig. 3, #22) and the moveable second filter (fig. 3, #23) being arranged such that the moveable first filter (fig. 3, #22) and the moveable second filter (fig. 3, #23) mirror one another relative to a central axis (fig. 3, central axis from "F" past #22 and 23) of x-ray projection from an x-ray source (fig. 3, source of "F") toward a subject (fig. 1, "P").

However, Popescu does not disclose a stationary filter having a length perpendicular to the central axis of x-ray projection from an x-ray source toward a subject having a longer length, a first motor assembly connected to the moveable first filter and a second motor assembly connected to a moveable second filter, and wherein the first and second motor assemblies are

configured to independently position a respective filter in an x-ray path to define an attenuation profile that substantially approximates a target shape.

Toth et al. teaches a stationary filter having a length perpendicular to the central axis of x-ray projection from an x-ray source toward a subject having a longer length (fig. 5, #94). Moore teaches a first motor assembly (figs. 1a and 2a, #30) connected to the moveable first filter (figs. 1a and 2a, #26 on left) and a second motor assembly (figs. 1a and 2a, #30) connected to a moveable second filter (figs. 1a and 2a, #26 on right) and wherein the first and second motor assemblies (figs. 1a and 2a, #30) configured to independently position overlapping filters, defined by bases, curved portions, and proximate tails, in an x-ray path to define an attenuation profile that substantially approximates a target shape (fig. 2a).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Popescu with the filter of Toth et al., since one would be motivated to make such a modification for improving beam quality (col. 1, lines 66-67) as shown by Toth et al.

It also would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Popescu as modified above with a longer filter, since such a modification would have involved a mere change in the size of a component. One would be motivated to make such a modification better ensure that the entire beam is filtered for improving beam quality (col. 1, lines 66-67) as implied from Toth et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Popescu with the motors of Moore, since

one would be motivated to make such a modification to provide more flexibility in shaping a profile (fig. 2a) as implied from Moore.

14. Regarding claims 19 and 20, Popescu as modified above suggests an apparatus as recited above.

However, Popescu does not disclose two motor assemblies configured to position overlapping filters, defined by bases, curved portions, and proximate tails, in an x-ray path to define an attenuation profile that substantially approximates a target shape.

Moore teaches two motor assemblies (figs. 1a and 2a, #30) configured to position overlapping filters, defined by bases, curved portions, and proximate tails, in an x-ray path to define an attenuation profile that substantially approximates a target shape (fig. 2a).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the apparatus of Popescu as modified above with the motors of Moore, since one would be motivated to make such a modification to provide more flexibility in shaping a profile (fig. 2a) as implied from Moore.

15. Regarding claim 21, Popescu as modified above suggests an apparatus as recited above.

However, Popescu does not disclose a stationary filter providing non-zero minimum attenuation.

Toth et al. teaches a stationary filter providing non-zero minimum attenuation (fig. 5, #94).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the apparatus of Popescu as modified above with the filter of Toth et al., since one would be motivated to make such a modification for improving beam quality (col. 1, lines 66-67) as shown by Toth et al.

16. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Popescu, Toth et al., and Moore as applied to claim 17 above, and further in view of Gunji et al. (JP 08-266523).

Popescu as modified above suggests an apparatus as recited above.

However, Popescu does not disclose filters with different contours.

Gunji et al. teaches filters with different contours (fig. 4, #23-1 and 23-2).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Popescu as modified above with the filters of Gunji et al., since one would be motivated to make such a modification to make filters more suitable for an examinee (abstract, purpose) as implied from Gunji et al.

17. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Popescu, Toth et al., and Moore as applied to claim 17 above, and further in view of Winter (US Patent 4998268).

Popescu as modified above suggests an apparatus as recited above.

However, Popescu does not disclose a CT system including a computer programmed to determine a target shape from a scout scan of a subject to be imaged.

Winter teaches a CT system (title) including a computer programmed to determine a target shape from a scout scan of a subject to be imaged (col. 8, line 57, to col. 9, line 11).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Popescu as modified above with the CT system of Winter, since one would be motivated to make such a modification to lessen risks to patients (col. 1, lines 61-64) as shown by Winter.

Response to Arguments

18. Applicant's arguments with respect to claims 1, 2, 5, 6, 8-14, and 16-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gk

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